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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/676,042 | 10/02/2003 | Mark H. Shipton | 117313 | 6932 |

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| EXAMINER | |
|---|---|
| AUSTIN, AARON | |
| **ART UNIT** | **PAPER NUMBER** |
| 1775 | |

DATE MAILED: 11/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/676,042 | SHIPTON ET AL. | |
| | Examiner | Art Unit | |
| | Aaron S. Austin | 1775 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *09 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-7 and 15-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 15-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-7 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over PCT International Application No. WO 94/18359 (WO '359) in view of Sangeeta (US Patent No. 6,395,406).

WO '359 discloses thermal methods of forming a stable intermetallic diffusion barrier on metallic substrates, such as turbine engines (page 1, lines 1-10). The diffusion barrier is formed by depositing a first layer of a first metal on the substrate, depositing a second layer of a second metal on the first layer, and performing a reaction treatment which causes the first and second metals to combine and form the diffusion barrier layer (page 3, lines 2-10). The heating step of the reaction treatment involves raising the deposited metals to a sufficiently high temperature to initiate the exothermic reaction necessary to form the intermetallic species in an inert vacuum environment (page 3, lines 31-38). The diffusion barrier may comprise platinum as the first metal and aluminum as the second metal applied to a titanium alloy (see Example 1 on page 5). Preferably the thickness of the diffusion barrier layer is between 0.1-10 micrometers (page 4, lines 8-11). Formation of the metallic layer may be through use of RF biased DC sputtering of particulate metal (page 5, lines 21-23). The thickness of the diffusion

barrier layer thereby limits the effective diameter of the metallic particles to necessarily fall within the claimed ranges.

WO '359 does not disclose the use of an organic carrier or the temperature range claimed.

Regarding the temperature range, WO '359 teach application of heat involving raising the deposited metals to a sufficiently high temperature to initiate the exothermic reaction necessary to form the intermetallic species in an inert vacuum environment (page 3, lines 31-38). A specific range is not taught, however the examples show application of heat at a temperature of 700° C or greater. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the temperature for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding the carrier, Sangeeta discloses several methods for manufacturing a platinum-aluminum barrier coating on metal surfaces as well as metallic substrates having a platinum aluminide coating directly on the substrate. The platinum-aluminum coating is obtained by preparing a slurry containing the appropriate amounts of platinum metal particles, aluminum metal particles, solvent, and compatible additives (including organic materials). The metal-containing slurry can be applied to any portion of a metallic substrate by various methods such as brush-painting, dipping, and spraying. The metal-containing slurry can be applied in one application or at least two applications for the purpose of obtaining optimum adhesion of the metallic layer to the substrate.

Sangeeta discloses the same process steps for manufacturing a platinum aluminide layer on a metallic substrate as claimed by the applicants (for example, producing a suitable metal-containing slurry, applying the slurry to a portion of a metallic substrate, heating the coated substrate to drive off most volatile components, and heat treating the coated substrate to form a distinct platinum aluminide coating on the substrate). See line 30 in column 3 to line 4 in column 5 and line 46 in column 5 to line 65 in column 7. Examples 1 to 14 (columns 8 to 11) disclose various metallic substrates having a platinum aluminide coating directly on the substrate.

With further regard to the temperature, Sangeeta also teaches evaporation of the volatile material included in the organic carrier (see Sangeeta column 6, lines 48-68 and column 7, lines 1-12). The heating of the material is controlled in a range of about 100° C to 400° C to avoid defects (column 6, lines 61-63). Therefore, as Sangeeta teaches low temperature heating within the claimed range to evaporate the organic carrier provides reduction of defects, it would be obvious to one of ordinary skill in the art at the time of the claimed invention to evaporate a portion of the volatile material of the organic carrier at a temperature within the claimed range to produce a less volatile product.

Therefore, as Sangeeta clearly teaches particular metals combined with solvent and compatible additives provides the advantage of a sprayable coating for the creation of a diffusion barrier, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to use a carrier in association with metallic particles for

sprayed application in the process taught by WO '359. Thus the claimed invention as a whole is *prima facie* obvious over the combined teachings of the prior art.

Regarding claim 5, Sangeeta teaches an organic carrier comprising volatile and non-volatile components dried by heat (column 6, lines 48-50). The carrier and metals are anchored together to the substrate.

***Response to Arguments***

Applicant's arguments filed August 9, 2006 have been fully considered but they are not persuasive.

In particular, Applicant argues WO '359 does not teach the platinum and aluminum as being particles. However, WO '395 does teach application of the platinum and aluminum by RF biased DC sputtering (page 5, lines 21-23). Sputtering of the layers includes application of particulate forms of the elements.

Further, Applicant argues WO '395 does not teach an organic carrier that includes particulate platinum and particulate aluminum such that a platinum aluminide barrier layer on a titanium alloy at a temperature range of 200° C to 600° C can be achieved. However, the contributions of the Sangeeta reference provide motivation for inclusion of an organic carrier as well as further reason for temperature use within the claimed range as set forth below.

Still further, Applicant argues WO '395 is limited by the teaching of application of a temperature at 750° C. However, it is the Examiner's position that this temperature is merely exemplary and, particularly in light of the teachings of Sangeeta, it would be

obvious to one of ordinary skill in the art at the time of the claimed invention to reduce the exemplary temperature to evaporate a portion of the volatile material of the organic carrier at a temperature of 100° C to 400 °C to produce a less volatile product (see Sangeeta column 6, lines 48-68 and column 7, lines 1-12). This heated reaction will form a layered product as claimed serviceable as a diffusion barrier on the substrate.

Moreover, Applicant argues WO '395 cannot obtain a coating that is less likely to be distorted during the cooling process, pointing to page 12, lines 9-11 of the present specification. However, the cited portion of the specification discusses the reduction of the likelihood of distortion with use of a lower temperature without further defining the comparison. WO '395 in view of Sangeeta teaches use of a low temperature that is expected to have the same characteristics of reduced oxidation and greater integrity discussed by Applicant's specification as compared to other methods.

Finally, Applicant argues Sangeeta's teaching of subsequent heat treatments in excess of the claimed temperature range fails to cure the deficiencies of WO '395. However, Sangeeta is used to teach the addition of an organic carrier and treatment of the organic material within the method of WO '395. The subsequent heat treatments of Sangeeta are not precluded by the "comprising" language of the claim and are not relied upon in the combination of references used for the rejection.

For at least these reasons, the rejection is maintained.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

In particular, U.S. Patent No. 6,613,445 (Sangeeta) teaches a method for application of metal slurry coatings, including platinum and aluminum, on a substrate including organic carriers and curing of the coating by heating in the range of 200° C to 300° C to evaporate volatile components and increase green strength (column 7, lines 2-15).

Further, U.S. Patent No. 5,102,700 (Baldi) teaches application of a metal aluminide, such as platinum impregnated platinum (column 6,lines 52—61), to substrates using volatilizable organic liquids (abstract). The product may be an aluminized titanium compressor blade (column 1, line 59). The organic carrier can be driven off when heated to about 600° C (column 3, line 16).

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron S. Austin whose telephone number is (571) 272-8935. The examiner can normally be reached on Monday-Friday: 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ASA

JENNIFER MCNEIL
SUPERVISORY PATENT EXAMINER
10/22/06